

What is claimed is:

1. A platelet production promoting agent comprising a chemically modified polypeptide wherein at least one group of the amino, carboxyl, mercapto or guanidino group in the molecule of a polypeptide having human granulocyte colony stimulating activity is chemically modified with a chemical modifying agent.

2. The polypeptide according to 1 wherein the polypeptide having human granulocyte colony stimulating activity comprises an amino acid sequence of SEQ ID NO:1, a part of said amino acid sequence, or an amino acid sequence wherein a part of amino acids of said sequence are replaced by other amino acids.

3. The platelet production promoting agent comprising the polypeptide according to claim 1 or 2 wherein a chemical modifying agent of the amino, carboxyl, mercapto or guanidino group is a polyalkylene glycol derivative or styrene-maleic acid copolymer.

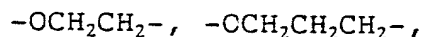
4. The platelet production promoting agent comprising the polypeptide according to claim 3 wherein the polyalkylene glycol derivative is a polyethylene glycol derivative, polypropylene glycol derivative, or derivative of polyethylene glycol-polypropylene glycol copolymer.

5. The platelet production promoter comprising the polypeptide according to claim 3 wherein the chemical

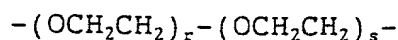
modifying agent of the amino group is polyalkylene glycol derivative having the formula (I):



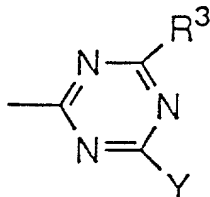
wherein R^1 represents alkyl or alkanoyl group; M represents the formula:



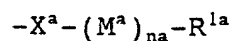
or



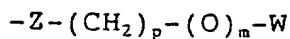
wherein r and s have any variable positive integral values, which are the same or different; n has any variable positive integral values; X represents a single bond, O, NH, or S; and R^2 represents the formula:



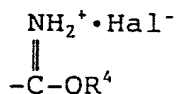
wherein R^3 represents OH, halogen, or the formula:



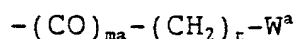
wherein X^a , M^a , R^{1a} and n_a are identical to said X, M, R^1 and n, respectively, and Y represents halogen or the formula:



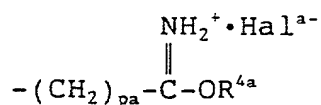
wherein Z represents O, S, or NH; W represents a carboxyl group, an active derivative thereof, or the formula:



wherein R^4 represents an alkyl group; and Hal represents halogen, and p has an integral value of 1 to 6; and m has a value of 0 or 1,

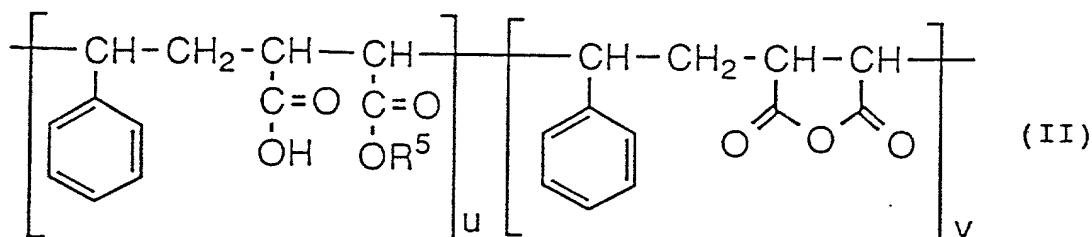


wherein W^a and ma are identical to said W and m, respectively; and t has an integral value of from 0 to 6, or



wherein Hal^a , pa and R^{4a} are identical to said Hal, p and R^4 , respectively,

and derivatives of the styrene-maleic acid copolymer having the formula (II):



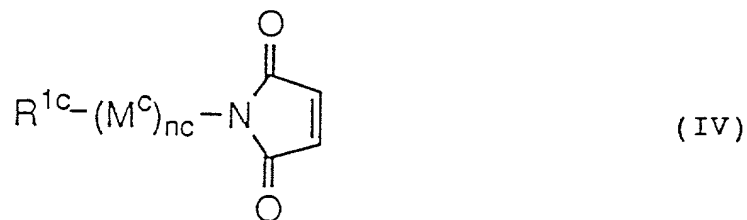
wherein u and v have any variable positive integral values, which are the same or different; and R^5 represents a hydrogen atom, or an alkyl group.

6. The platelet production promoting agent comprising the polypeptide according to claim 3 wherein the chemical modifying agents of carboxyl groups are polyalkylene glycol derivatives having the formula (III):

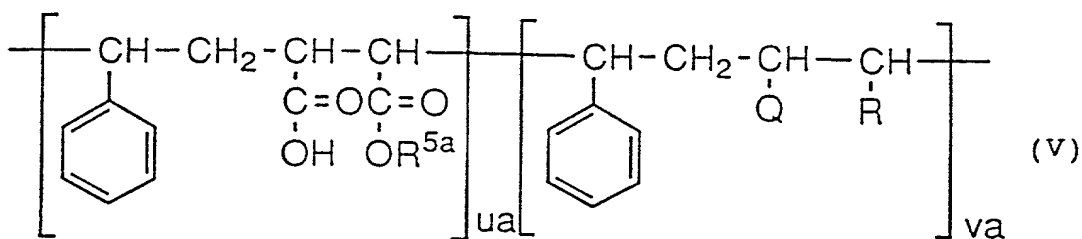


wherein M^b , R^{1b} and nb are identical to said M , R^1 and n , respectively.

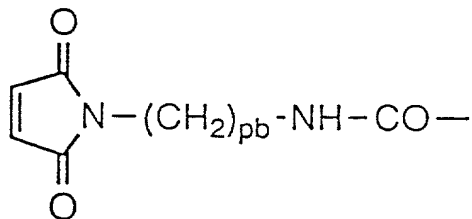
7. The platelet production promoter comprising the polypeptide according to claim 3 wherein the chemical modifying agents of mercapto groups are polyalkylene glycol derivatives having the formula (IV):



wherein M^c , R^{1c} , and nc are identical to said M , R^1 , and n , respectively, and styrene-maleic acid copolymers having the formula (V):

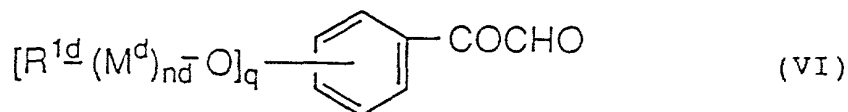


wherein R^{5a} , ua , and va are identical to said R^5 , U , and V , respectively, and one of Q and R represents a carboxyl group, and the other represents the formula:



wherein pb is identical to said p.

8. The platelet production promoting agent comprising the polypeptide according to claim 3 wherein the chemical modifying agents of guanidino groups are polyalkylene glycol derivatives having the formula (VI):

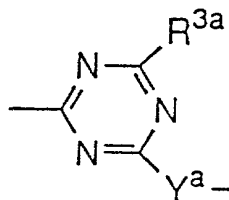


wherein q has a value of 1 or 2, and M^d , R^{1d} , and nd are identical to said M, R^1 , and n, respectively.

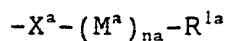
9. A platelet production promoter comprising a modified polypeptide wherein at least one of the amino groups in the molecule of the polypeptide having human granulocyte colony stimulating activity binds to a group represented by the following formula (Ia):



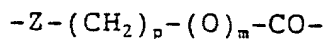
wherein R^1 represents an alkyl or alkanoyl group; n has any variable positive integral value; X represents a single bond, O, NH, or S; R^{2a} represents the formula:



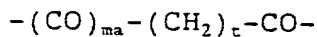
wherein R^{3a} represents OH, halogen, or the formula:



wherein X^a , R^{1a} and n_a are identical to said X , R^1 and n , respectively, and Y^a represents a single bond, the formula:



wherein Z represents O , S , or NH ; p has an integral value of from 1 to 6; and m has a value of 0 or 1, or the formula:



wherein ma is identical to said m ; and t has an integral value of from 0 to 6.

10. A method for treating a patient with decreased platelet counts comprising administering an effective amount of the chemically modified polypeptide as defined by claim 1, 2, 3, 4, 5, 6, 7, 8, or 9 to the patient.

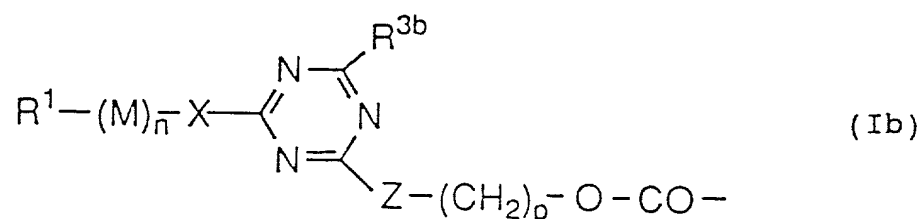
11. Use of the chemically modified polypeptide as defined by claim 1, 2, 3, 4, 5, 6, 7, 8, or 9 for the production of pharmaceutical compositions which are useful for the treatment of the patients with decreased platelet counts.

12. Use of the chemically modified polypeptide as defined by claim 1, 2, 3, 4, 5, 6, 7, 8, or 9 for treating patients with decreased platelet counts.

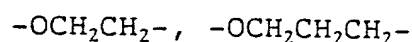
13. A composition for treating patients with decreased platelet counts, which comprises the chemically modified polypeptide as defined by claim 1, 2, 3, 4, 5, 6, 7, 8, or 9 in the pharmaceutically acceptable dosage form with a pharmaceutically acceptable carrier.

14. A chemically modified polypeptide comprising

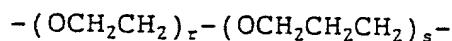
a polypeptide having human granulocyte colony stimulating factor activity wherein at least one amino group in the molecule is substituted with a group of the formula (Ib):



wherein R^1 represents an alkyl or alkanoyl group; M represents the formula:



or



wherein r and s have any variable positive integral values, which are the same or different, n has any variable positive integral value; X represents a single bond, O, NH, or S; R^{3b} is identical to R^{3a} ; Z represents O, S, or NH; and p has an integral value of from 1 to 6.